

AMSAT News Service Weekly Bulletins

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AMSAT NEWS SERVICE

ANS-341

The AMSAT News Service bulletins are a free, weekly news and information service of AMSAT North America, The Radio Amateur Satellite Corporation. ANS publishes news related to Amateur Radio in Space including reports on the activities of a worldwide group of Amateur Radio operators who share an active interest in designing, building, launching and communicating through analog and digital Amateur Radio satellites.

The news feed on <http://www.amsat.org> publishes news of Amateur Radio in Space as soon as our volunteers can post it.

Please send any amateur satellite news or reports to:
ans-editor at amsat.org.

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ANS-341 AMSAT News Service Weekly Bulletins

AMSAT News Service Bulletin 341.01

>From AMSAT HQ KENSINGTON, MD.

DATE December 7, 2014

To All RADIO AMATEURS

BID: \$ANS-341.01

AMSAT Board Approves Technology Development Seed Funding

The AMSAT Board of Directors met on December 2, 2014. As a part of AMSAT's "Design The Next AMSAT Satellite" challenge, the Board of Directors approved \$5000, within the 2015 engineering budget, to be used as seed money for future satellite development. Additional fund raising sources will also be investigated and pursued.

AMSAT President Barry Baines, WD4ASW, said, "We're prepared to return to space starting in 2015 with a fleet of satellites that will equal, if not exceed, the performance, and availability to the average ham, of our previously popular AMSAT OSCAR 51. Meanwhile, we are preparing for the future looking to potentially leverage new technologies, to provide the best opportunities for enhancing amateur radio's presence in space."

Director Tom Clark, K3IO, noted the need for a defined future systems program. Tom said, "We saw a significant number of both new and old members who want to see the development of critical system elements for future opportunities by 2018-20. As I see it, critical 'tall poles' in applying potential technologies require significant work to begin now to ensure success."

AMSAT is interested in supporting technology ideas that enhance the utility of using the CubeSat form factor to support more robust amateur satellite capabilities. The scope of potential interest is not limited; some examples of technology enhancement might include:

- + Microwave technology suitable for use in amateur spacecraft. This includes the need to identify optimum frequency bands.
- + Complementary, low-cost ground systems, including an effective ~1° antenna pointing system.
- + Define and develop optimum coding and modulation schemes for low power microwave use.
- + Attitude determination & control systems to point the spacecraft antennas towards the user while maximizing solar panel production.

Individuals interested in learning more about this initiative should contact AMSAT Vice President-Engineering Jerry Buxton, N0JY (n0jy@amsat.org).

Meanwhile, the development of AMSAT's current series of the Fox-1 cubesats continues on schedule. AMSAT Vice-President of Engineering, Jerry Buxton, N0JY reported during the Board meeting that construction and testing of five Fox satellites is on schedule:

- + Fox-1A will launch on a NASA ELaNa flight during the 3rd quarter of 2015 from Vandenberg AFB,
- + Fox-1B will fly with the Vanderbilt University radiation experiments expected in 2016.
- + Fox-1C will launch on Spaceflight's maiden mission of the SHERPA multi-cubesat deployer during the 3rd quarter of 2015. This flight was purchased by AMSAT.
- + Fox-1D is a flight spare for Fox-1C. If not needed as a spare it will become available to launch on any open launch slot which becomes available and be submitted in a CSLI proposal in 2015.
- + Fox-1E is built as a flight spare for Fox-1B but has been included in a student science proposal as part of the November, 2014 Cubesat Launch Initiative (CSLI) for an ELaNa flight slot. If selected the Fox-1B spare will fly as Fox-1E.

More details of the "Design The Next AMSAT Satellite" challenge can be found on-line at:

<http://www.amsat.org/?p=3395>

- and - in the November/December 2014 AMSAT Journal, currently in-

transit to your QTH.

[ANS thanks the AMSAT Board Of Directors for the above information]

November/December AMSAT Journal is Ready

The November/December 2014 AMSAT Journal is completed and has been sent to the print shop.

The contents of this issue include:

- + AMSAT Announcements
- + Apogee View
- + November 15 - 40th Anniversary of A0-7 Launch
- + A Checklist to Design The Next AMSAT Satellite!
Jerry Buxton, N0JY
- + AMSAT Engineering Update
Jerry Buxton, N0JY
- + Satrack - Doppler and AZ/EL Control Software
Pedro Converso, LU7ABF
- + Operating F0-29 from CN73
Lee (Doc) Ernstrom, WA7HQD
- + Taking Part in the ARISS Project on a \$500 Budget
Dr. Michael Butler, MA, MSc, PhD, G4OCR
- + How to Get Your AMSAT Challenge Coin
- + AMSAT Field Operations Report
Patrick Stoddard, WD9EWK
- + ARISS 2014: A Program in Transition
Frank Bauer, KA3HDO, et al
- + An Eyeball QSO in India
Burns Fisher W2BFJ

Thanks to all who contributed!

[ANS thanks the AMSAT Journal for the above information]

AMSAT SKN ON OSCAR 2015

You are cordially invited to participate in Straight Key Night on OSCAR 2015, sponsored by AMSAT for radio amateurs throughout the world.

This year's event is being held in memory of Captain Charles Dorian, W3JPT, who passed away in 2014, aged 92. Chuck, who had held many senior positions in the U.S. Coast Guard, was one of AMSAT's earliest members and served as secretary of the Board of Directors.

Participation in AMSAT SKN on OSCAR is easy and fun. Just operate CW, using a straight key or non-electronic "bug," through any amateur satellite between 0000 and 2400 UTC on January 1, 2015. There is no need to send in a log, but all participants are asked to nominate someone they worked for "Best Fist." Your nominee need not

have the best fist of those you heard, only of those you worked. Send your nomination to w2rs(a)amsat.org. A list of "Best Fist" nominees will be published in early February.

[ANS thanks Ray, W2RS for the above information]

ARISS Discusses Ham TV, Elects New International Officers

Amateur Radio on the International Space Station (ARISS) is continuing explore the possibility of establishing a network of ground stations to enable the use of the Ham TV video system during ARISS school contacts. Mark Steiner, K3MS, updated the ARISS International team on the topic during its November meeting, conducted by teleconference. Kerry Banke, N6IZW, who works on ARISS hardware issues, reported that a document under development will describe just what is required to build a ground station. He and ARISS International Project Selection & Use Committee representative Lou McFadin, W5DID, have successfully received Ham TV transmissions.

ARISS-EU President Gaston Bertels, ON4WF, has been working with European Space Agency (ESA) management to finalize the agreement that transfers custody of the Ham Video transmitter from ESA to ARISS. Steiner told the teleconference that more "blank" test transmissions could take place, once the custodial agreement is finalized.

NASA Astronaut Mike Hopkins, KF5LJG, successfully installed and commissioned the ARISS) Ham Video system last March. The system can transmit video of the crew and the interior of the Columbus module on the 2.4 GHz band (S-band). Last April, Japanese Astronaut Koichi Wakata, KC5ZTA, served as the host for a successful final commissioning pass for the Ham Video transmitter and camera. The ARISS project, led initially by ARISS-EU, AMSAT-Italy, and ESA, would enhance ARISS school contacts by providing a video and audio downlink, plus an audio-only uplink.

Operating under the call sign OR4ISS, the S-band transmitter can be connected to one of two ARISS patch antennas on Columbus. Radiated RF power is on the order of 10 W EIRP. The commissioning process primarily involved making sure that ground stations in Europe would be able to copy the DTV downlink signal. Commissioning of the overall "Ham TV" system culminated more than a decade of planning and preparation.

During the November 18 teleconference ARISS International delegates re-elected the current slate of officers for new 2-year terms starting on January 1, 2015. The incumbents are ARISS Chair Frank Bauer, KA3HD0; ARISS Vice-Chair Oliver Amend, DG6BCE, and ARISS Secretary-Treasurer Rosalie White, K1ST0. In keeping with tradition, Canada's ARISS delegate Ian MacFarquhar, VE9IM, handled the election logistics.

[ANS thanks ARISS, ARRL, & AMSAT-UK for the above information]

Amateur radio spacecraft received over 1 million km from Earth

Michal Zawada SQ5KTM received signals from the ARTSAT2:DESPATCH and Shin'en2 spacecraft on Friday evening, December 5 at a distance of around 1,100,000 km from Earth.

Ham radio spacecraft launched into deep space

<http://amsat-uk.org/2014/12/03/ham-radio-spacecraft-launched-into-deep-space/>

[ANS thanks AMSAT-UK for the above information]

Japanese Satellites Carrying Amateur Radio Payloads are Launched into Deep Space

This week, Japan successfully launched its Hayabusa 2 asteroid sample-return mission into deep space, and with it, two satellites carrying Amateur Radio payloads. A Japan Aerospace Exploration Agency (JAXA) rocket lifted off on schedule early on December 3 (UTC), carrying the Hayabusa 2 spacecraft on the first leg of its journey to Asteroid 1999 JU3. Along for the ride into deep space are two Amateur Radio satellites, Shin'en 2 (Abyss 2) and ARTSAT2:DESPATCH. The launch had been postponed twice owing to unfavorable weather conditions. Shin'en 2 will identify as JG6YIG, while ARTSAT2:DESPATCH will use the call sign JQ1ZNN.

Shin'en2 carries a 0.1 W CW beacon on 437.505 MHz and telemetry on 437.385 MHz (0.8 W) using a mode similar to WSJT. It will also carry a F1D digital store-and-forward transponder with an uplink of 145.942 MHz and a downlink at 435.270 MHz (0.4 W), but not the Amateur Radio Mode J linear transponder announced earlier. The data format is posted on the Kagoshima University website.

A linear SSB/CW transponder had been part of the initial design, but, according to Hideo Kambayashi, JH3XCU, that had to be abandoned because of regulatory issues. The digital transponder will offer earthbound hams an opportunity to test the limits of their communication capabilities, however. The project also is hoping to gather listener reports.

ARTSAT2:DESPATCH carries a 7 W CW transmitter on 437.325 MHz. Onboard will be the first sculpture ever to be carried into deep space. The ARTSAT2:DESPATCH mission is seeking "exceptionally skilled ham operators" as part of its "cooperative diversity communication" experiment. This effort will attempt to intercept signals from the spacecraft not only at the ground station in Tokyo, but at Amateur Radio stations around the world, "in order to reconstruct the original data from the spacecraft."

"Reception of such weak signals to reconstruct data from the spacecraft will require the expertise of exceptionally skilled ham operators," the satellite's developers explained.

The two spacecraft will have an elliptical orbit around the Sun and travel to a deep space orbit between Venus and Mars. With an orbital inclination of nearly zero, the spacecraft should stay in Earth's equatorial plane. The distance from the Sun will be between

approximately 6.5 million and 12 million miles.

[ANS thanks ARRL and AMSAT-UK for the above information]

HAMSAT II – Dhruva Space and AMSAT India

The Economic Times report Dhruva Space, a two-year-old start-up co-founded by space technologist and ham radio operator Sanjay Nekkanti VU3ISS/AB30E, sealed a deal with AMSAT India on November 30, 2014 to develop HAMSAT II. VU3at-OSCAR-52_HAMSAT

It will be the successor to HAMSAT V0-52 which went silent on July 11, 2014 due to the failure of the on-board lithium ion batteries. HAMSAT provided a valuable communications resource for the amateur radio community for over 9 years.

Dhruva's satellites are expected to be launched on ISRO's workhorse Polar Satellite Launch Vehicle (PSLV). Nekkanti said his team is working closely with the space organization for design approvals and testing of the satellite.

The AMSAT India Secretary Nitin Muttin, VU3TYG has released this statement:

We are pleased to announce that AMSAT India and Dhruva Space Pvt. Ltd. have signed a Memorandum of Understanding on November 30th 2014 to pursue the development of a follow up mission to HAMSAT launched in 2005 on-board the PSLV-C6. HAMSAT II is envisioned to fill the gap created by the recent end of life of HAMSAT and shall continue servicing the societal needs in disaster management, amateur/emergency radio communications and education.

Some of the contemplated payloads for HAMSAT II include:

- * U/V Analog FM Transponder
- * U/V Linear Transponder, 50 kHz
- * APRS Digipeater
- * Digitalker

Read The Economic Times article at
<http://economictimes.indiatimes.com/articleshow/45354501.cms>

AMSAT India
<http://amsatindia.org/>

[ANS thanks Dinesh, AB3DC and AMSAT-UK for the above information]

SpinSat Now in Orbit

The US Naval Research Laboratory SpinSat satellite was successfully deployed from the International Space Station on November 28. SpinSat arrived at the ISS on September 21 via the SpaceX Falcon 9 resupply vehicle. For the next few days, SpinSat's orbit will approximate that

of the ISS. The ISS real-time tracker on the ISS Fan Club website can show when the spacecraft are within range.

The 125-pound SpinSat, a 22- inch diameter sphere, carries a 2 W 9600 bps AX.25 packet radio store-and-forward system on 437.230 MHz. The satellite's primary mission is to demonstrate a new micro-thruster technology, from which SpinSat derives its name; its 12 electronically controlled solid-propellant thrusters will be fired in pairs to spin the spacecraft.

Equipped only with primary batteries and just 4.8 grams of fuel, the satellite's working phase is expected to last up to 6 months

[ANS thanks ARRL and AMSAT-UK for the above information]

Surrey Space Centre SME-SAT

The Surrey Space Centre (SSC) are developing a 3U CubeSat SME-SAT expected to launch into a 550-620 km orbit using the ISIP0D CubeSat deployer.

The mission objectives are:

A: Outreach – The satellite will provide beacons for which amateur satellite users and ham radio users will be able to receive.

B: Space qualification and performance characterisation of sensors.

- * High performance COTS Gyroscopes (x3).

- * High precision MEMS accelerometers.

- * Aperture Star Camera, At a later point in the mission these will be used in conjunction with the ADCS to characterise the closed loop performance of the sensors.

C: Performance characterisation of Nano-Control Moment Gyros (CMGs) for agility. The mission is equipped with 4-Nano-CMGs in a pyramid configuration for ADCS. This part of the mission will evaluate the performance of this system on the ADCS and agility of the satellite.

D: Space qualification and performance characterisation of the EPS
The EPS for this mission has heritage from the Delfi-C3 and other missions and includes additional improvements to be demonstrated on this mission.

E: Smart Thermal Radiation Devices (STRD tiles) SME-SAT is equipped with a number of STRD tiles on the outside faces of the satellite for passive thermal management of the internal structure.

F: Flux Gate Magnetometer The mission contains a scientific grade miniaturized flux gate magnetometer that sits on the end of a deployable boom to improve the performance of the sensor. This payload will be switched into the ADCS for evaluation of performance during parts of the mission but is not the primary magnetometer for ADCS.

G: GPS SME-SAT also contains an experimental GPS system that will be switched into the ADCS loop at stages in the orbit to evaluate the performance of the system.

Planning a 9k6 RC-BPSK UHF downlink using AX25.

Further information at

http://www.surrey.ac.uk/ssc/research/space_vehicle_control/smesat/index.htm

IARU Satellite Frequency Coordination

<http://www.amsat.org.uk/iaru>

[ANS thanks AMSAT-UK for the above information]

AMSAT Events

Information about AMSAT activities at other important events around the country. Examples of these events are radio club meetings where AMSAT Area Coordinators give presentations, demonstrations of working amateur satellites, and hamfests with an AMSAT presence (a table with AMSAT literature and merchandise, sometimes also with presentations, forums, and/or demonstrations).

* Friday and Saturday, 11-12 December 2014 – Tampa Bay Hamfest in Plant City FL (Agricultural Show Center)

* Sunday, 4 January 2015 – Ham Radio University in Bethpage NY (Briarcliffe College)

* Saturday, 10 January 2015 – Thunderbird Hamfest 2015 in Phoenix AZ (43rd Avenue, between Greenway and Bell Roads)

* Saturday, 14 February 2015 – Greater Los Angeles Mensa Regional Gathering 2015 in Los Angeles CA (Concourse Hotel at Los Angeles International Airport) – satellite- and AMSAT-related presentation

* Friday and Saturday, 20-21 February 2015 – Yuma Hamfest in Yuma AZ (Yuma County Fairgrounds, 32nd Street between Pacific Avenue & Avenue 3E, south of I-8 exit 3)

* Saturday TBD in mid-March 2015 – Scottsdale Amateur Radio Club Hamfest in Scottsdale AZ

* Saturday, 28 March 2015 – Tucson Spring Hamfest in Tucson AZ (22nd Street, east of Columbus Blvd.)

* Saturday TBD in early May 2015 – Cochise Amateur Radio Association Hamfest in Sierra Vista AZ

* Saturday TBD in early June 2015 – White Mountain Hamfest in Show Low AZ

[ANS thanks AMSAT-NA for the above information]

Call for Proposals ARISS Contact Opportunity

Proposal Window October 17 to December 15, 2014.

The Amateur Radio on the International Space Station (ARISS) Program is seeking formal and informal education institutions and organizations, individually or working together, to host an Amateur Radio contact with a crew member on board the ISS. ARISS anticipates

that the contact would be held between May 1, 2015 and December 31, 2015. Crew scheduling and ISS orbits will determine the exact contact dates. To maximize these radio contact opportunities, ARISS is looking for organizations that will draw large numbers of participants and integrate the contact into a well-developed education plan.

The deadline to submit a proposal is December 15, 2014. Proposal information and documents can be found at www.arrl.org/hosting-an-ariss-contact.

The Opportunity

Crew members aboard the International Space Station will participate in scheduled Amateur Radio contacts. These radio contacts are approximately 10 minutes in length and allow students and educators to interact with the astronauts through a question-and-answer session.

An ARISS contact is a voice-only communication opportunity via Amateur Radio between astronauts and cosmonauts aboard the space station and classrooms and communities. ARISS contacts afford education audiences the opportunity to learn firsthand from astronauts what it is like to live and work in space and to learn about space research conducted on the ISS. Students also will have an opportunity to learn about satellite communication, wireless technology, and radio science. Because of the nature of human spaceflight and the complexity of scheduling activities aboard the ISS, organizations must demonstrate flexibility to accommodate changes in contact dates and times.

Amateur Radio organizations around the world, NASA, and space agencies in Russia, Canada, Japan and Europe sponsor this educational opportunity by providing the equipment and operational support to enable direct communication between crew on the ISS and students around the world via Amateur Radio. In the US, the program is managed by AMSAT (Radio Amateur Satellite Corporation) and ARRL (American Radio Relay League) in partnership with NASA.

More Information

Interested parties can find more information about the program at www.ariss.org and www.arrl.org/ARISS.

For proposal information and more details such as expectations, proposal guidelines and proposal form, and dates and times of Information Sessions go to <http://www.arrl.org/hosting-an-ariss-contact>.

Please direct any questions to [ariss\(a\)arrl.org](mailto:ariss(a)arrl.org).

[ANS thanks ARISS, AMSAT-Edu, and the ARRL for the above information]

ARISS News

Upcoming Contacts

* From 2014-11-10 to 2014-12-07, there will be no US Operational Segment (USOS) hams on board ISS. So any schools contacts during this period will be conducted by the ARISS Russia team.

[ANS thanks ARISS, Gaston, ON4WF and Charlie, AJ9N for the above information]

Satellite Shorts From All Over

COSMOS-2491 RS-46

Dmitry Pashkov R4UAB reports that the COSMOS-2491 satellite carries RS-46 operating on 435.465 MHz and 435.565 MHz (+/- Doppler).

The satellite was launched on December 25, 2013 and is in a 1,515.8 km by 1,489.1 km 82.5 degree inclination orbit.

Track COSMOS-2491 / RS-46 at
<http://www.n2yo.com/satellite/?s=39497>

Listen for RS-46 online with the SUWS WebSDR located near London
<http://amsat-uk.org/2014/08/15/suws-websdr-moves-to-new-site/>

COSMOS-2499 Callsign RS-47!

COSMOS-2499 (2014-028E) was launched on May 23, 2014 and is now in a 1,510.6 km by 1,158.8 km 82.4 degree orbit. Dmitry Pashkov R4UAB has received signals from the satellite on approximately 435.465 MHz and 435.565 MHz (+/- Doppler). On November 30 the satellite started identifying itself in Morse code on 435.465 MHz as RS-47.

There has been some mystery concerning the purpose of COSMOS-2499. In a post updated November 20, 2014 Anatoly Zak @RussianSpaceWeb wrote: Ground observations indicated that the mystery satellite had not exceeded 0.3 meters in size. Previously, two Rockot launches with trios of Rodnik/Strela-3M launches also carried Yubileiny (a.k.a. MiR) experimental satellites with a reported mass from 48 to 100 kilograms. As with the previous launch, observers were at a complete loss about the possible purpose of the satellite.

Cosmos-2499 has made a number of orbital changes since it was first launched. For further information see
<http://www.russianspaceweb.com/Cosmos-2499.html>

Track COSMOS-2499 / RS-47 at
<http://www.n2yo.com/?s=39765>

Listen for RS-47 online with the SUWS WebSDR located near London
<http://amsat-uk.org/2014/08/15/suws-websdr-moves-to-new-site/>

RS-47 Telemetry data
<http://www.dk3wn.info/p/?p=52752>

Dmitry Pashkov R4UAB describes receiving the 435.465 MHz and 435.565

MHz signals at
<http://tinyurl.com/R4UAB-COSMOS-2499>

[ANS thanks Dmitry Pashkov R4UAB and AMSAT-UK for the above information]

Job Opportunity: Quantum CubeSat Electronics and Software Engineer

The Centre for Quantum Technologies (CQT) at the National University of Singapore (NUS) is looking for a talented and motivated engineer with electronics and software expertise to join a young and dynamic team developing science-grade cubesats to host state-of-the-art, quantum communications experiments.

The successful candidate will be responsible for the electronics and software of the satellite platform and will be engaged in the complete cycle of satellite development from PDR, to operation of satellites in space. They will work with the team to:

- Specify and integrate spacecraft subsystems from our contracted cubesat company.

- Develop software to run the experiments and downlink the data via an s-band network.

- Perform extremely rigorous on-the-ground testing and verification of the satellite and its payload.

- Assist with electronics and software related issues with the satellite and the payload as they arise.

They will need to be comfortable in a small-team academic environment, flexible to changing priorities and requirements, and they will need to develop a good understanding and appreciation of the science payload and its working so as to best fulfill their duties.

A proven track-record in developing successful, optimized, electronics and software for control of experiments and instrumentation in space or similar harsh environments is required. Previous experience with the space industry, space hardware and/or cubesats is very desirable but all cubesat-specific technical training can be provided on-the-job by an internationally successful cubesat company.

For an overview article on the project see:
http://www.quantumtlah.org/media/story/2012_OPN_Alexfeature.pdf

Both Singaporeans and international applicants are encouraged to apply. NUS is a globally ranked university and Singapore is a clean, vibrant, multicultural English-speaking country with very high standards of living. Salary is based on experience and skills but will be internationally competitive.

Interested candidates should send a CV and cover letter to
[cqtrb\(a\)nus.edu.sg](mailto:cqtrb(a)nus.edu.sg) and
[cqtalej\(a\)nus.edu.sg](mailto:cqtalej(a)nus.edu.sg)

[ANS thanks CubeSat.org mailing list for the above information]

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In addition to regular membership, AMSAT offers membership in the President's Club. Members of the President's Club, as sustaining

donors to AMSAT Project Funds, will be eligible to receive additional benefits. Application forms are available from the AMSAT Office.

Primary and secondary school students are eligible for membership at one-half the standard yearly rate. Post-secondary school students enrolled in at least half time status shall be eligible for the student rate for a maximum of 6 post-secondary years in this status. Contact Martha at the AMSAT Office for additional student membership information.

73,
This week's ANS Editor,
Joe Spier, K6WAO
k6wao at amsat dot org